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PROPOSAL FOR TRIALS TO COMPARE THE PERFORMANCE OF AN ANDERSON STRATHCLYDE R.H. 22 ROADHEADER WITH THE DOSCO MK 2b ROADHEADER AT THE LINGAN-PHALEN MINE

G.A. Haslett
Cape Breton Coal Research Laboratory

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MARY

This report outlines proposals to conduct trials that will compare the performances of the Anderson Strathclyde R.H. 22 and the Dosco MK 2b roadheaders.

The equipment is being used to develop the new Lingan-Phalen Mine. It incorporates new technology - water jet assist-for which there is no quantified data.

The proposed trials would:

(i) Assess the performance of the equipment.

(ii) Assess impacts on safety and health with the use of such equipment.

(iii) Suggest improvements that could be made to such equipment.

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*Project Engineer, Cape Breton Coal Research Laboratory, CRL, CANMET, Energy, Mines and Resources Canada, Sydney.

PROPOSITION PORTANT SUR LA TENUE D'ESSAIS AFIN DE COMPARER LA PERFORMANCE DES MACHINES DE TRAÇAGE ANDERSON STRATHCLYDE R.H. 22 ET DOSCO MK 2b À LA MINE LINGAN PHALEN

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RÉSUMÉ

Le présent rapport présente des propositions visant la tenue d'essais dans le but de comparer les performances des machines de traçage Anderson Strathclyde R.H. 22 et Dosco MK 2b.

L'équipement est présentement utilisé pour l'aménagement de la nouvelle mine Lingan-Phalen et utilise la nouvelle technique de lavage à jet hydraulique pour laquelle il n'existe actuellement aucune donnée quantitative.

Les essais proposés porteraient sur:

(i) L'évaluation de la performance de l'équipement.

(ii) L'évaluation des conséquences de son utilisation sur la santé et la sécurité des travailleurs.

(iii) Les suggestions visant les améliorations qui pourraient être apportées à l'équipement.

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*Ingénieur de projet, Laboratoire de recherche sur le charbon du Cap-Breton, LRC, CANMET, Énergie, Mines et Ressources Canada, Sydney.

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PROPOSAL FOR TRIALS TO COMPARE THE PERFORMANCE OF AN ANDERSON STRATHCLYDE R.H. 22 ROADHEADER WITH THE DOSCO MK 2b ROADHEADER AT THE LINGAN-PHALEN MINE

1. PURPOSE OF THE TRIALS

The R.H. 22 and the Dosco MK 2b roadheaders are mutually comparable machines. They are both comparatively recent products with specifications that confirm their selection as appropriate to the drivage of the slope tunnels for the development of the Lingan Phalen mine.

Both machines incorporate a new feature for roadheaders, that of water jet assisted cutting technology. It is believed that many more machines will be produced incorporating water jet assist. However, Cape Breton Development Corporation are currently amongst the first operators to use these machines.

It is important therefore that the claims of the manufacturers of these machines be verified, namely that with water assist:

- There is a reduction in pick wear.
- There is an increase in cutting penetration and therefore an increase in overall performance.
- That the possibilities for frictional ignitions are greatly reduced.
- There is a decrease in vibration during cutting.
- There is a reduction in power consumption.
- There is a reduction in the production of airborne respirable dust.

The amalgamation of all such claims can have a significant impact on:

- The overall cost of drivage of these tunnel slopes.
- Repair and maintenance costs.
- An improvement in operating costs from more effective machine utilisation times and less breakdown times.
- The safety and health of the employees.

The essential differences between the two machines are in the profiles of the cutting heads, the pick lines and the methods of applying water assist (ie. by intensifiers with the R.H. 22 machine and by a five stage pump with the Dosco MK 2b).

It is important to CBDC that the performance and other characteristics be quantified. Additional machines will be put into operation at Lingan Phalen and other CBDC sites.

2. METHODOLOGY FOR TRIALS

Two options are considered namely:

- The collection of data each shift recorded by the tunnelling personnel. The costs of such a trial will be assimilated into the general operating costs.

- The collection of detailed time-study data by additional personnel with one person per shift being allocated to each machine to monitor and record comprehensively all the data considered appropriate to a full scale trial.

Option (i) trial data acquisition will be limited to:

(a) Effective machine utilisation time ie. time spent by machine cutting and loading.
(b) Steel arches set/shift.
(c) Pick consumption (replacement).
(d) Note of any unusual pick wear patterns.
(e) Water pressure at the pump or intensifier.
(f) Water volume used for cutting.
(g) Power consumed.
(h) Airborne dust levels (supplementary personnel required).

Option (ii) trial data acquisition will include additionally to all that given by an Option (i) trial.

(j) Volume of coal/volume of rock cut.
(k) Cutting pattern adopted.
(l) Estimate of rock hardness and type.
(m) Information for time study analysis on each shift.
(n) Subjective information ie. vibration level on machine, amount of water present at the tunnel face and etc.
(o) Distance of fan duct outlet from the tunnel face and the ventilation quantity.

3. DISCUSSION ON METHODOLOGIES FOR TRIALS

Both options have inherent risks, and will require careful managing.

To operate with option (i) might bring requests from UMWA for supplementary payments because of additional duties. The quality of information recorded at times might be dubious. On site management must be prepared to discipline workers who refuse to provide the information requested.

To operate with option (ii) will involve an expenditure in additional salaries and benefits for six persons/day. The quality of information recorded would be both more accurate and complete.

An adequate explanation for the presence of an additional person with each tunnelling crew will have to be given to avoid the perception that such a person is recording performances of individuals.

4. DURATION AND TIMING OF THE TRIALS

The trials should not be started until management is satisfied that each crew is sufficiently experienced in the operation, and that the system and equipment has no patent defects. (ie. completed break in and training period).

The trials should occupy a minimum period of at least four months with the first two weeks devoted to orientation/training to ensure the accuracy and completeness of data collection.

The trial period would then be broken up into a number of further two to four week periods. At the start of each period all cutter picks would be replaced.

The initial trial period would be undertaken at the manufacturers recommended water jet assist pressure. Subsequent trial periods would be conducted at reduced water pressures. The lowest water pressure trial would be with jet assist sprays used as conventional water sprays. The last trial period would be a repeat of the first trial period (ie. at the manufacturers recommended water jet assist pressures).

5. PARTICIPATION BY CBCRL IN THE TRIALS

CBCRL is prepared to undertake the assembly and analysis of the data collected during the trial and present the results in the form of a confidential report.

CBCRL is also prepared to:

a) Provide day to day coordination and management of the data collection exercise.

b) Assist in the measurement of airborne respirable and total dust.

c) Conduct scientific experiments relative to water jet assist technology in coal and rock. Such experiments could help evaluate the performance that would be expected from water jet assisted shearers in the Phalen Seam.

6. ACTIONS

- selection of option (i) or (ii),
- development and approval of detailed shift data sheets,
- development and approval of trial periods (duration, water pressure, and the like),
- selection of trial starting date.